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10/697,768	10/30/2003	Arne Thaler	58585US002	8876

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EXAMINER

HU, HENRY S

ART UNIT PAPER NUMBER

1713

DATE MAILED: 01/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/697,768

Applicant(s)

THALER ET AL

Examiner

Henry S. Hu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on IDS of April 1, 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-42 is/are rejected.
- 7) ☒ Claim(s) 13 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 5 pages.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

1. It is noted that USPTO has received two IDS' with a total of five pages filed on March 1, 2004 and April 1, 2004 respectively. **Claims 1-42 are pending now.** An action follows.

#### *Specification*

2. The disclosure is objected to because of the following informalities:
  - (a) On **page 2**, line 21, recitation of "0.0001-10% by weight" is better changed to **"0.0001 to 10 % by weight"** to be consistent with the same wording used on page 2 at line 19.
  - (b) On **page 5**, line 29, the chemical formula of " $R_4N^+OH$ " should be changed to **" $R_4N^+OH$ "** to be consistent with the traditional way with balanced charges.

Appropriate corrections for (a) and (b) are required.

#### *Claim Objections*

3. Claim 13 is objected to because of the following informalities:

On **Claim 13** at line 1, recitation of "preemulsion" is better changed to **"pre-emulsion"** to be consistent with the same wording already used on its parent Claim 1 at line 3.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. The limitation of parent *Claim 1* in present invention relates to **a method of aqueous emulsion polymerization of two or more fluoromonomers** comprising the steps of: (1) **forming a pre-emulsion** by mixing  **$CF_2=CF-R^1-SO_2X$**  with  $R^1$  and  $X$  as specified and **with 0.001-0.9 molar equivalents of a base, in the absence of added emulsifier**; and (2) **reacting said pre-emulsion with one or more comonomers in the absence of added emulsifier, said comonomers being perfluorinated, so as to form a fluoropolymer latex comprising a fluoropolymer wherein more than 1 mol% of monomer units are derived from  $CF_2=CF-R^1-SO_2X$** . See other limitations of dependent *Claims 2-42*.

6. Claims 1-33 are rejected under 35 U.S.C. 102(b) as being anticipated by Connolly et al. (US 3,282,875).

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Regarding the limitation of parent **Claim 1**, **Connolly et al.** have disclosed the preparation of various fluorocarbon vinyl ether copolymers as demonstrated in several working examples, for instance, the copolymers of **VDF, HFP and a perfluorovinyl ether (0.2-5 mole%)** with a general formula of  $\text{CF}_2=\text{CF}[\text{O}-\text{CF}_2-\text{CFY}]_n-\text{O}-\text{CF}_2\text{CF}(\text{R}_f)-\text{SO}_2\text{M}$ , wherein **Y is F or CF<sub>3</sub>; R<sub>f</sub> is F or perfluoroalkyl group; and M is F, OH or OMe (wherein Me is a alkali metal or quaternary ammonium radical)**. A specific formula of  $\text{CF}_2=\text{CF}-\text{O}-\text{CF}_2-\text{CF}(\text{CF}_3)-\text{O}-\text{CF}_2\text{CF}_2-\text{SO}_2\text{F}$  is used as working example (column 1, line 59 – column 2, line 16; column 1, line 13-37). It is noted that all co-monomers in the copolymers are perfluorinated, while no surfactant or emulsifier is needed in the process. Connolly further discloses that the sulfonyl fluoride group is first converted to the specific form of acid or the **acid salt** in the aqueous media of a **pH of 8 or lower** before co-polymerization (column 2, line 55-65). **Example V** at column 3, line 59-62 and **Example IX** at column 4, line 25-49 have shown its conversion to sodium salt or ammonium salt of the corresponding sulfonic acid in the aqueous media so that other comonomers can be added for co-polymerization to give aqueous dispersions of copolymers. **Such a preparation of acid salt solution on Example V is reading on the step #1 limitation of Claim 1, while the co-polymerization process on Example IX is reading on the step #2 limitation of Claim 1.**

7. Regarding **Claims 2 and 3**, Connolly **did not rule out** using more than 5 mole% of the above-mentioned sulfonate-containing perfluorovinyl ether. According to the statement of Connolly, it is due to economic factor as well as good elastomer to keep the amount under 5 mole%. Particularly see column 1 at line 61-64 and column 2 at line 1-6.

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Regarding **Claim 4**, Connolly uses **sodium hydroxide** (column 3, line 65-66).

Regarding **Claims 5-12 and 14**, by using the perfluorovinyl ethers with a general formula of  $\text{CF}_2=\text{CF}[\text{O}-\text{CF}_2-\text{CFY}]_n-\text{O}-\text{CF}_2\text{CF}(\text{R}_f)-\text{SO}_2\text{M}$  it would anticipate the limitations of Claims 5-12.

Regarding **Claim 13**, other perfluorovinyl ethers such as  $\text{CF}_2=\text{CF}-\text{O}-(\text{CF}_2)_n-\text{CF}_3$  can be included in step #1 (column 1, line 52-58).

Regarding **Claim 15**, **ethylene** can be used as comonomer (column 1, line 29-31)

Remaining dependent **Claims 16-33** are thereby rejected with the same reason the above rejections of Claims 1-15.

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title; if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 34-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Connolly et al. (US 3,282,875) in view of Tatemoto (US 6,274,677 B1).

The discussion of the disclosures of the prior art of Connolly for Claims 1-33 of this office action is incorporated here by reference. Regarding **Claims 34-42**, the Connolly reference is **silent about making a polymer electrolyte membrane comprising the hydrolyzed fluoropolymer from Claims 1-33**. Tatemoto et al. teach the preparation of various ionic copolymers comprising perfluorovinyl ether sulfonic acid derivatives (title; abstract, line 1-15). The advantage is that such a type of copolymers is useful as **polymeric electrolyte in the form of membrane** such as ion-exchange membrane or a fuel cell membrane (column 1, line 13-19; column 6, line 20-35). In light of the fact that Connolly and Tatemoto are preparing the same or similar type of sulfonate-containing perfluorinated copolymers, one having ordinary skill in the art would therefore have found it obvious to apply Connolly's copolymer to be used as a **polymeric electrolyte membrane** as taught by Tatemoto. Therefore, it is useful in the area of ion exchange and fuel cell.

### *Conclusion*

10. The prior art made of record and not relied upon is considered pertinent to applicants' disclosure. The following references relate to a method of aqueous emulsion polymerization of  $\text{CF}_2=\text{CF}-\text{R}^1-\text{SO}_2\text{X}$  with other fluoromonomer in the absence of added emulsifier:

US Patent No. **6,498,216 B1 to Cheng** discloses a dyeable fluoropolymer fibers and films when it is modified by cationic dye agents (abstract, line 1-18). The fluoropolymer may contain the acid or ionic functionality of fluorinated sulfonate group. However, **no claimed two-step process of polymerization is disclosed** (column 2, line 39 – column 4, line 15). Therefore, Cheng fails to teach or fairly suggest the copolymers of present invention.

US Patent No. **6,667,377 B2 to Feiring et al.** discloses the preparation of polyvinylidene fluoride ionomers containing pendant **fluoroalkylsulfonyl imide or methide** groups (title; abstract, line 1-7). The fluoropolymer may contain the acid or ionic functionality of fluorinated sulfonate group. However, **no claimed two-step process of polymerization is disclosed** (column 2, line 27 – column 4, line 42). Therefore, Feiring fails to teach or fairly suggest the copolymers of present invention.

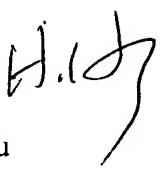


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11. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Henry S. Hu whose telephone number is (571) 272-1103. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (571) 272-1114. The fax number for the organization where this application or proceeding is assigned is (703) 872-9306 for all regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Henry S. Hu

January 7, 2005

  
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